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On June 5, 1985, the Government-University-Industry Research Roundtable conducted a hearing designed to be the first step in what will be a continuing process by the Research Roundtable of seeking ways to improve the efficiency and effectiveness of the sponsored research system. The goal of the hearing was to identify ways to simplify the system generally and to remove unnecessary administrative, management, and financial procedures within government and university. This document is a summary statement of the major issues raised during the hearing. It begins with a brief discussion of the nature of the problem of bureaucratic accretion and then moves on to a description of the solutions to these problems that were proposed during the hearing. Hearing participants recognized the difficulty in bringing about change in the sponsored research system, and the next section summarizes their concerns. The final sections of the summary statement identify topics that deserve additional attention beyond that given to them on June 5, and describe developments in reducing bureaucratic accretion since the hearing. (Author/CW)

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THE GOVERNMENT—UNIVERSITY—INDUSTRY
RESEARCH ROUNDTABLE

Reducing Bureaucratic Accretion in Government and University Procedures for Sponsored Research

New Approaches in Process and Additional Areas for Attention

Proceedings of a Hearing June 5, 1985

Summary

NATIONAL ACADEMY PRESS
Washington, D.C. 1985

The Government-University-Industry Research Roundtable

The Government-University-Industry Research Roundtable was created in 1984 to provide a forum where scientists, engineers, administrators, and policymakers from government, university, and industry can come together on an ongoing basis to explore ways to improve the productivity of the nation's research enterprise. The object is to try to understand issues, to inject imaginative thought into the system, and to provide a setting for discussion and the seeking of common ground. The Roundtable does not make recommendations, nor offer specific advice. It does develop options and bring all interested parties together. The uniqueness of the Roundtable is in the breadth of its membership and in the continuity with which it can address issues.

National Academy of Sciences
National Academy of Engineering Institute of Medicine

The Government-University-Industry Research Roundtable is sponsored by the National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. The National Academy of Sciences was established in 1863 by an Act of Congress as a private, nonprofit, self-governing membership corporation for the furtherance of science and technology for the general welfare. The terms of its charter require the National Academy of Sciences to advise the Federal Government upon request within the Academy's fields of competence. Under this corporate charter, the National Academy of Engineering was established in 1964, and the Institute of Medicine was established in 1974.

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REDUCING BUREAUCRATIC ACCRETION IN GOVERNMENT AND UNIVERSITY SPONSORED RESEARCH

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Georgia Institute of Technology

JOHN WIESENFELD
Professor of Chemistry
Cornell University

HEARING AGENDA

8:00
REGISTRATION, Entry to NAS Lecture Room

8:30
WELCOMING REMARKS *Dale R. Corson,* Chairman, Research Roundtable

8:45
OPENING ADDRESS *Joseph R. Wright,* Deputy Director, Office of Management and Budget

"Reform 88: Management of the Federal Government"

9:15
THE PRE-AWARD PROCESS OF FUNDING RESEARCH

Scientific and Administrative Perspectives on:

- Procedures Prior to Proposal Submission
- Proposal Preparation
- Proposal Review Procedures
  - —Frequency of application cycles
  - —Criteria for evaluations
  - —Review process
- Required Pre-Award Certifications
- Renewal Procedures

9:15 Commentators on the Pre-Award Process—*Russell Kaufman, Donald Langenberg, Marvin Moss and John Wiesenfeld*
Questioning by the Hearing Panel

10:45 BREAK

11:00 Discussion—Questions and Comments from the Audience

11:45
LUNCH, NAS Refectory

1:00

THE POST-AWARD PROCESS OF FUNDING RESEARCH

Scientific and Administrative Perspectives on:

- Modes of Research Support
  - —Funding mechanisms (e.g., individual projects, research programs, center grants, block grants, career development awards)
  - —Funding periods
  - —Support for conduct of research vs. infrastructure (equipment and facilities)
  - —Renewal procedures
- Management of Sponsored Research
  - —Scientific project management
  - —Prior approval requirements
  - —Budget flexibility within a project
  - —Recordkeeping and cost transfers between projects
  - —Rules for purchasing and other management requirements
- Oversight of Sponsored Research
  - —Oversight of performance
  - —Evaluation of research output
  - —Scientific vs. financial accountability
  - —Audit: frequency, uniformity of interpretation of guidelines, and focus (e.g., system audit or audit of specific transactions)

1:00 Initial commentators on the post-award process—*Elke Jordan, Anthony Merritt, JoAnne Stubbe, John White,* and *Robert Newton* accompanied by *Thomas Dolan* and *Ellen Feinsilber*
Questioning by the Hearing Panel

2:30 Discussion—Questions and Comments from the Audience

3:15 BREAK

3:30 Additional Commentators on the Post-Award Process—*Emanuel Donchin, Henry Kirschenmann,* and *Robert Coakley* accompanied by *Reid Detchon*
Questioning by the Hearing Panel

4:30 Discussion—Questions and Comments from the Audience

5:00

WRAP-UP Hearing Panel and *Alvin Trivelpiece,* Director, Office of Energy Research, Department of Energy

- Synthesis of Major Issues
- Areas for Modification of Existing Procedures—By Universities; By Government
- Areas Where Major Changes may be Needed
- Next Steps; Roles for Research Roundtable; Roles for Other Groups

5:30–7:00

COCKTAIL RECEPTION, NAS Auditorium Gallery

PREFACE

The Government-University-Industry Research Roundtable was created under the auspices of the National Academies of Sciences and of Engineering as an alternative approach to important issues in American science and engineering. The Roundtable is unique in two respects. First, it was created on the assumption that all sectors--government, university, and industry--share the responsibility for the stewardship of the scientific and engineering enterprise and for ensuring its continuing contributions to the national well-being. The Roundtable Council, which includes senior federal R&D officials, senior officials from academia and industry, and working scientists, and which is the organization's guiding body, illustrates this commitment.

The second unique feature of the Roundtable is its ongoing nature. It is not a group convened to study an issue, write a report, disband, and go home. The Roundtable is a means for addressing the important issues within a structure that provides for continuity and follow-up. To the best of my knowledge, this is the first time that all the parties have sat down together in an organized manner, and on a continuing basis, to examine the critical problems and opportunities facing American science and engineering.

The Research Roundtable is organized into four working groups. Working Group One focuses on the identification, recruitment, and retention of talent for science and engineering research. Working Group Two addresses federal-university sponsored research relationships and the physical infrastructure and organizational arrangements for academic research. Working Group Three is concerned with the new alliances among universities, industry, the financial community, and federal and state governments. Working Group Four addresses major issues underlying the entire research and engineering enterprise.

Roundtable Working Group Two planned, organized, and conducted the hearing on "Reducing Bureaucratic Accretion in Government and University Procedures for Sponsored Research." Redressing bureaucratic accretion in the sponsored research system will require constant attention by the government, university, and industry communities. With this realization in mind, the Working Group convened the hearing as the first step in what will be a continuing process of seeking ways

to improve the efficiency and effectiveness of the sponsored research system.

The problems of bureaucratic accretion in the sponsored research system are not new. Nor, for the most part, are the solutions to these problems that were proposed during the hearing. The importance of the hearing derived from the participation of all the parties that must be involved in designing and implementing modifications in the current sponsored research system. This has not been the case previously. In the words of one official with long-time federal and university experience in sponsored research: "This is the first time in all the years I've been involved in these discussions where we have had these kinds of people all in one place, looking at each other, and exchanging views; and I think that is very healthy and very constructive."

The sponsored research system was indeed in the room on June 5. The ingredients for change were present: the officials with "their hands on the levers of power" together with the persons who operate the system on a day-to-day basis--working scientists and engineers, research administrators, contracts and grants officials, auditors and program officers. I was especially impressed by the thoughtfulness and seriousness with which these participants addressed the subject. They have all participated in sessions on these issues more often than they would like to count. Other research issues are more topical currently. Yet the participants brought a degree of freshness and enthusiasm to the discussion that was gratifying to me and to the other Roundtable Council and Working Group members who organized and participated in the hearing.

The results of the day-long discussion are encouraging. Specific suggestions were made for modifying the sponsored research system, with an emphasis on the principles that should underlie its operation. It was heartening that the day was not spent arguing about the details of Office of Management and Budget circulars or other specific administrative procedures. The day ended with a sense among many of the participants that each could do some things within his or her own institution to improve the sponsored research system and, with continuing attention, to improve the overall system. Momentum has been generated for examining and modifying the sponsored research system. All parties with a stake in the system and with the power to change it are involved. The challenge facing the Research Roundtable is to maintain this momentum and to ensure that it continues to be distributed throughout all elements of the system.

The most impressive development since the hearing is an effort among the major federal R&D agencies, with support from the Research Roundtable, to design a standard federal instrument for the support of university-based fundamental research with streamlined administrative

requirements. The extraordinary spirit of cooperation among the agency participating officials and their extensive knowledge of academic research and government procedures make me optimistic about the prospects for improvements.

The success of the hearing is due to the contributions of all parties involved. Roundtable Working Group Two, under the chairmanship of Alvin Trivelpiece, Director of Research at the Department of Energy, organized the affair; government and university officials assumed major responsibility for preparing valuable background materials; the hearing commentators presented succinct statements of their views on how the system could be improved; and hearing panel and the participants asked penetrating questions and contributed additional good ideas. All these efforts are greatly appreciated. Special thanks go to the Sloan and Mellon Foundations and to the National Research Council Fund for their generous support for Research Roundtable activities.

Dale R. Corson
Chairman
October 1985

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EXECUTIVE SUMMARY

On June 5, 1985, the Government-University-Industry Research Roundtable conducted a hearing on reducing bureaucratic accretion in the sponsored research system. The goal of the hearing was to identify ways to simplify the sponsored research system generally and to remove unnecessary administrative, management, and financial procedures within both government and university sponsored research systems.

The problems of bureaucratic accretion identified at the hearing are not new. Nor, for the most part, are the proposed solutions to these problems. The importance of the hearing lay in the fact that all of the parties that need to be involved in designing and implementing modifications in the current sponsored research systems were in the room. The ingredients for change were present: the officials with "their hands on the levers of power" together with the persons who operate the system--working scientists and engineers, research administrators, contracts and grants officials, auditors, and program officers.

The senior government and university officials endorsed the acceptability of measures to improve research productivity through identification and removal of "useless and nonproductive" procedures from the system. Operating personnel, therefore, can proceed to work on reducing bureaucratic accretion with some assurance that there will be protection against the risks inherent in implementing such change; the level of necessary "criticism insurance" is decreased.

Hearing participants identified some of the causes of bureaucratic accretion in the sponsored research system and some of the problems resulting from the increased rules and regulations. They include:

- Imbalance in the Use of Investment and Procurement Approaches to Funding Academic Research. Investment approaches as a rule are better adapted to basic research while procurement practices are appropriate only to certain types of university-based research, especially applied research supported by the mission-oriented agencies. Today, however, the research system is tilted toward the procurement approach for all types of research.

- o Lack of Congruence Between Funding Methods and Research Programs. The application of the procurement model leads to requirements in the sponsored research system that are incompatible with the conduct of university-based fundamental research. Such elements include excessive requirements for methodological descriptions in research proposals, relatively short-term project funding, the compartmentalization of research programs into arbitrary project units, and the application of cost-reimbursement principles to project management.

- o Increased Accountability. Pressures for increased accountability have come from the Comptroller General's statement in the mid-1970s, various General Accounting Office reports, congressional hearings, as well as other sources.

- o Increased Competition. Increased competition for research funds has resulted in requirements for longer and more detailed grant applications and perhaps in an excess of agency controls and regulations promulgated with the intent of ensuring maximum research productivity with limited funds. Additionally, increased competition causes research scientists to submit research proposals to several sources in order to maintain their research groups.

- o Opportunity Costs. The largest cost of bureaucratic accretion is the opportunity cost of the time that investigators spend writing proposals, reviewing other's proposals, and managing their grants, instead of doing research and supervising junior investigators. Research administrators also spend time on administrative tasks that could be devoted more usefully to other areas. Increased competition exacerbates these costs because the volume of proposals submitted is increased.

- o Financial Management Requirements. The flexibility in managing research grant funds, and in making allocation decisions on the campus, is limited by the need to obtain prior agency approval for many financial decisions and by the requirement to follow line-item budgets.

- o Criticism Insurance. Bureaucrats, governmental and academic, tend to put controls on the system to protect themselves and their organizations from public criticism.

Proposals to overcome these problems and to improve the sponsored research system were based on two central themes: (1) the need to improve productivity in all sectors of American society including the research sector and (2) the need to tilt the sponsored research system

back toward greater reliance on an investment approach to support of basic research, while recognizing that procurement procedures will continue to be appropriate for more applied and mission-oriented research.

The suggestions for improving the sponsored research system fall into two categories--those concerned with the pre-award phase of sponsored research and those concerned with the post-award phase. Suggestions for improvements in the pre-award phase include:

- o Preproposal Contact. Increased oral communication between scientific and program officers and prospective proposers of research would help to streamline the proposal submission process.

- o Standardized Proposals. Simplification and standardization across the federal agencies of the requirements for preparing proposals, and for obtaining approval of procedures for meeting social objectives, would save money and improve scientific productivity.

- o Accomplishment-Based Awards. In selecting research for funding, more emphasis should be placed on investigators' previous work and less on estimates of the value of proposed work.

- o Longer Funding Periods. Increasing the duration of basic research awards from 3 years to 5 would substantially decrease the constant shuffle of proposals required to maintain research endeavors.

- o Differentiating Pre-Award Procedures. Review, evaluation, and award decisions should be more closely linked to the career stage of the prinicipal investigator.

Suggestions for improvement in the post-award phase include:

- o Financial Flexibility. Greater flexibility in allocating dollars both within and between projects, in extending projects without additional funds, and in using unexpended balances would lead to greater efficiency in the use of grant funds and would improve research productivity.

- o Unit of Accountability. The unit of post-award accountability, currently the individual project grant, should be broadened to focus on the total research program of the individual investigator and the total business management systems of the university.

- o Delegating Prior Approvals. The prior approval authorities instituted by the National Science Foundation and National Institutes of Health should be expanded and standardized across all federal agencies.

- o Standardized Administrative Requirements. Post-award financial and administrative requirements should be standardized across the federal agencies.

- o Administrative Incentives. Some form of incentive should be devised to reward universities for effectiveness in providing research administration, financial, and management procedures.

Two comprehensive approaches to modifying the sponsored research system, incorporating many of the individual suggestions listed above, were proposed: (1) a fixed-price grant and (2) a standard federal research support agreement. Essential features of these approaches include pre-award review of the scientific merit of the proposal and of the business management system of the host institution, post-award review of the scientific accomplishments and of the expenditure of funds, and delegation of responsibility to the principal investigator for most of the decisions for managing the research during performance.

Both proposals eliminate the need for transaction-by-transaction federal and institutional approvals and reviews, place the responsibility for research management with the individual investigator, and thereby serve to move the sponsored research system toward an investment-oriented relationship between sponsors and performers. Since the hearing, representatives of the major federal R&D agencies have made substantial progress on designing a standard federal agreement for the support of university research and on developing a demonstration program in which this agreement will be tried out.

"The climate is right for change" was a common refrain among many hearing participants. In their view, convergence around a common set of principles that should guide the sponsored research system is as close as it has ever been. It is time to test new approaches through pilot programs, demonstration programs, and other types of trials.

HEARING SUMMARY

INTRODUCTION

On June 5, 1985, the Government-University-Industry Research Roundtable conducted a hearing on "Reducing Bureaucratic Accretion in Government and University Procedures for Sponsored Research." The hearing was designed to be the first step in what will be a continuing process by the Research Roundtable of seeking ways to improve the efficiency and effectiveness of the sponsored research system. The goal of the hearing was to identify ways to simplify the system generally and to remove unnecessary administrative, management, and financial procedures within government and university.

The 1 day hearing was organized around sessions focusing on scientific and administrative perspectives on the pre-award and the post-award processes in the sponsored research system. A hearing panel, consisting of representatives of the university, government, and industrial communities, guided the hearing. Commentators, again from all sectors, presented remarks that responded to a standard set of questions. (These questions, entitled "Questions to Guide the Remarks of the Commentators and the Participant Discussion," are included in Part III of the full report.) Following questioning by the hearing panel, the invited audience had the opportunity to make comments and ask questions of both the commentators and the hearing panel. The complete hearing agenda and lists of hearing panelists and commentators are found on pages vii-x.

The full report on the hearing is organized into three parts. Part I (of which this is an adaptation) is a summary statement of the major issues raised during the hearing. It begins with a brief discussion of the nature of the problem of bureaucratic accretion and then moves on to a description of the solutions to these problems that were proposed during the hearing. Hearing participants recognized the difficulty in bringing about change in the sponsored research system, and the next section summarizes their concerns. The final sections of the summary statement identify topics that deserve additional attention beyond that given to them on June 5 and describe developments in reducing bureaucratic accretion since the hearing. Part II of the full report includes the opening address delivered by Joseph R. Wright, Deputy

Director, Office of Management and Budget (OMB), and the complete statements by each of the commentators; Part III includes the background materials that were supplied to all participants in advance of the hearing. A list of hearing participants, all those who attended the event, is provided in the Appendix.

Nature Of The Problem

As the sponsored research system has grown and aged, it has acquired layers of administrative, management, and financial procedures. This accumulation is the result of myriad individual actions that seemed sensible at the time and were recommended by the Congress, executive agencies, universities, and practicing scientists and engineers; all participants in the research enterprise have contributed. It was the feeling of many at the hearing that over time these individual actions have resulted in an accretion of bureaucratic requirements both in the government and in the universities that are limiting the productivity of American science and engineering. The current state of affairs is documented in Part III of the full report in an "Analysis of Administrative Requirements Associated with Sponsored Research Agreements."

Some of the causes of this bureaucratic accretion and the problems resulting from it are outlined below. The discussion is brief as these issues have been described in extensive detail in other places, for example, reports of the National Commission on Research in 1980 and the report by the National Academy of Sciences Committee on Government-University Relations in Support of Science in 1983.

Investment Versus Procurement

Imbalance in the use of the investment and procurement approaches to funding academic research was mentioned frequently as the source of much of the bureaucratic accretion that is sapping scientific creativity and productivity. Investment approaches to research support generally involve financial assistance for investigator-driven projects or broadly based institutional research programs. Procurement approaches generally involve highly specified short-term, goal-driven research projects, funded on a cost-reimbursement basis, using standard accounting cost principles. Many hearing participants felt that investment approaches as a rule are better adapted to basic research while procurement practices are appropriate only to certain types of university-based research, especially applied research supported by the mission-oriented agencies.

It was the consensus of hearing participants that the sponsored research system today is tilted toward the procurement approach. As the research enterprise has grown in size and complexity, as the competition for funding has increased, and as pressures for more rigorous accounting have accumulated, many federal agencies and universities have found it easier to borrow characteristics from well-developed procurement systems than to develop unique and more appropriate approaches to research support. Commentator Donald Langenberg of the University of Illinois at Chicago remarked that the faults with the system "arise from failures to solve some problems of management and control in a manner which is consistent with the underlying imperatives of the research process,...that is to say, in a manner which recognizes the differences between that process and many others that occur in our economic and social systems. One obvious example is the difference, the profound difference, between procurement or acquisition and assistance or investment."

Lack of Congruence Between Funding Methods and Research Programs

The application of the procurement model leads to requirements in the sponsored research system that many feel are incompatible with the conduct of university-based fundamental research. Such elements include excessive requirements for methodological descriptions and other details in research proposals, relatively short-term project funding with fixed start and stop dates, the compartmentalization of research programs into arbitrary project units, the application of cost-reimbursement principles to project management which leads to transaction-by-transaction accountability, the lack of flexibility in allocating resources locally, and expenditure-driven audits rather than performance-driven evaluations. Commentator Emanuel Donchin of the University of Illinois summarized the current system: "The government does not give the university money to do research but pays it back for money already spent on projects approved by the program mechanism. The agency cannot reimburse the school unless the costs are documented, and the costs cannot be determined to be allowable unless the project is carefully defined. This approach is simply not appropriate to the research enterprise." "The granting institutions," Elke Jordan of the National Institutes of Health (NIH) feels, "have come to view grants more like procurements through which the funding agency is expected to provide every resource that can possibly be justifed in terms of direct or indirect costs for conducting a research project rather than as something in the nature of gifts, which are to be used in the most economical and effective way possible."

The views of Henry Kirschenmann of the Department of Health and Human Services, an experienced government official on the administrative and accounting side of sponsored research, were similar. He listed the fundamental disagreement between many in research and many in government over what a grant is supposed to be funding, and the basic incompatability between the theory and reality of research project grants, as central areas of difficulty in the sponsored research system. "If research activities supported by research project grants are not in fact discrete projects...there can be no meaningful accountability, financial or otherwise...," Kirschenmann maintained. "We need to design support programs, and accountability for them, based on the reality of how research is performed. I am convinced that, if we can solve the dilemma of the research project grant and can link the scientific and administrative aspects of the research activity, almost everything else will fall into place. This is no small task, because...the project grant has become ingrained."

Increased Accountability

Pressures for increased accountability have come from many sources. Congressional staff member Robert Coakley recounted the Comptroller General's statement in the mid-1970s that 2 to 10 percent of the federal budget is consumed by fraud, waste, and abuse. This statement led to the Inspector General's Act, led to congressional initiatives, and led to the financial management mentality referenced throughout the hearing. Various General Accounting Office reports and congressional hearings also were cited as sources of additional specific accountability requirements in the sponsored research system.

Increased Competition

The increased competition in the scientific research system is illustrated by the situation at NIH, as described by its director James Wyngaarden. "Since the early 1970s," Wyngaarden noted, "the NIH budget for extramural research has grown about 2 percent annually in real dollars. The number of investigator-initiated awards about doubled during that period, and the number of applicants about tripled. The upshot is that the agency now funds about 38 to 39 percent of the approved proposals as opposed to about 50 percent a decade ago." One result is longer and more detailed grant applications. Marvin Moss of the Office of Naval Research (ONR) noted that the ONR budget can support a level of research effort today only about 50 to 55 percent of that in 1965. In trying to get the maximum research productivity from these dollars, Moss admitted that the agencies may become "over zealous" in promulgating controls and regulations.

The Proposal Mill

Increased competition also has effects on research scientists. Investigators often have to obtain grants from several sources to maintain a viable research group. Commentator John Wiesenfeld of Cornell University pointed out that the critical mass for a research group in chemistry is probably four scientists. To support such a group, the principal investigator must maintain a flow of funds from two or three grants simultaneously. The investigator must keep enough new proposals in the works to assure continued support. Commentator JoAnne Stubbe of the University of Wisconsin agreed and maintained that many investigators, in their efforts to stay afloat, are submitting proposals for the same research to two or three agencies.

These are not trivial tasks. "Rare is the working scientist," Wiesenfeld said, "who does not approach proposal preparation with fear and loathing. Typically one must devote at least 1 month, and sometimes 2 or more, to the preparation of extensively documented and prodigiously detailed manuscripts which should, in the best of worlds, provide a clear picture of one's immediate and medium-range research plans. Only rarely is this goal achieved." The availability of diverse sources of support is considered a strength of our research system, but each agency has different proposal requirements and procedures. Taking advantage of this diversity, therefore, places an added burden of paperwork on individual investigators.

Financial Management Requirements

The flexibility in managing research grant funds and in making allocation decisions on the campus is limited by the need to obtain prior agency approval for many financial decisions such as cost transfers between grants and within grants, purchase of equipment costing more than a specified amount, and allocation of pre-award costs. Commentator Elke Jordan of the NIH described the process as "the tendency of government to try to assure the outcome of a grant by exerting budgetary controls." She went on, "I and my staff spend time approving things that we really cannot judge at a distance, and I doubt that a university official some few hundred yards away is in any better position than we are." "Ultimately," said Commentator Anthony Merritt of the University of Pennsylvania, "the agencies do recognize that the principal investigator is best able to decide how to manage his or her program and allocate resources. Requests for prior approval are very rarely denied so the whole prior approval process in most cases is little more than a paper pushing exercise that proves nothing from an accountability perspective."

Opportunity Costs

There was discussion of the expense to the research system of following requirements like those described above and discussion of the appropriateness of this expense given the objectives that the requirements are intended to achieve. Recurrent questions posed by commentators, panelists, and participants were: How much does the regulation or procedure cost to implement? What are the benefits of these expenditures? How many dollars are saved with these controls? What is the cost savings of reduced bureaucratic requirements? Some individual universities have documented some of these expenses; but, according to Commentator Robert Coakley of the Senate Governmental Affairs Committee, the government has never assessed the overall costs of implementing these requirements.

In the opinion of Commentator Donald Langenberg and others, the biggest administrative cost by far is "unbudgeted and unaccounted for." It is the "opportunity cost" of the time that investigators spend writing proposals, managing their grants, and reviewing others' proposals instead of doing research and supervising junior investigators. Principal investigators must do these jobs, but they have become so cumbersome as to turn the investigators themselves into bureaucrats. David Mears of the University of California system made a similar point with respect to the time of research administrators: "We have four staff on one of our campuses who do nothing but quarterback cost transfers. Is that efficient use of funds? No, it is not."

Criticism Insurance

Bureaucrats, governmental and academic, tend to put controls on the system to protect themselves and their agencies from public criticism. Hearing panelist Jan Mares of the Department of Energy pointed out that agency personnel who work on research awards "are at great personal risk of selecting $500 coffee pots and being excoriated in the press...." David Mears added: "Agencies devised the rules because something went wrong out there...and that is why we have a rule on foreign travel and a rule on time and effort reporting.... The rules are criticism insurance policies, and they tend to accrete." Serge Gratch of the Ford Motor Company contended, "People seek to protect themselves in this way because our system of rewards is wrong. We punish people for making mistakes instead of emphasizing special rewards for innovation. Until we learn to change our reward system there is no cure." John Dearden of Johns Hopkins University concurred, based on the statement of an agency official to him that "the last thing we want to do is attempt something innovative because it will focus attention on us, and we are punished for errors of commission, not for errors of omission."

Solutions: Proposed Improvements in the System

The starting point for examining means to overcome inefficiencies of the sponsored research system was the current efforts under way within the individual federal agencies. These are described in Part III of the full report under the heading "Current Agency Initiatives for Improving the Sponsored Research System," and include special, longer-term research grant awards, simplified procedures for grant renewal, departmental statements on simplified research support relationships, and new approaches to financial and management procedures such as the Total Business Systems Review (TBSR) program of the Office of Naval Research, the Institutional Prior Approval System (IPAS) of the National Institutes of Health and the Organizational Prior Approval System (OPAS) of the National Science Foundation (NSF).

The purpose of discussing these new approaches was to ensure that the community is aware of them and to provide an opportunity for comments that would assist the agencies in continuing and expanding those initiatives considered to be most effective. Judging by comments received since the hearing, which are described later in this summary, individual agencies and individual universities are continuing to pursue means to simplify the sponsored research system.

Push for Productivity

In his opening address, Joseph Wright, the Deputy Director of the OMB, set the stage for the examination of additional approaches to improving the sponsored research system. He described the Administration's "Reform 88" program, which he heads, that is striving to bring about major increases in productivity throughout the Federal Government. In part, the rationale for the program lies in the view that improved productivity in all sectors, including the research community, is essential to the nation's international competitiveness. He encouraged the hearing participants to examine carefully means for modifying the sponsored research system and emphasized that they need to show how any proposed changes will improve the efficiency and effectiveness of the performance of the system. Wright's concluding challenge to the group was that he is "totally open to and supportive of ideas for simplifying the requirements of OMB circulars such as Circular A-21, if it can be shown that the changes will yield better performance of the system." Wright established improved productivity as one rationale for examining possible changes in the sponsored research system.

In the view of many participants, this initial tone was important not only to the conduct of the hearing but also to the prospects for bringing about improvements in the system. Hearing panelist Harold

Hall of the Xerox Corporation noted the significance of the fact that a senior Administration official had endorsed the acceptability of behavior directed toward improving research productivity through identifying and removing "useless and nonproductive" procedures from the system. Such behavior is now widespread in industry, including Xerox, and is underway within the Federal Government and universities. Fifteen years ago, while Hall was associated with the Commission on Government Procurement, the problems were as evident as they are today, but no senior offical provided the impetus for proceeding; Wright provided that at the hearing, in Hall's view.

William Massy of Stanford University commented that Wright's remarks as well as those of other senior government and university officals at the hearing should serve to reduce the level of criticism insurance sought by mid-level personnel. They can feel that it is acceptable to work on reducing bureaucratic accretion with some assurance that there will be protection against the risks inherent in implementing such change.

Investment Approach

The second major theme cited as underpinning further changes in the sponsored research system is the need to tilt the system back toward a greater reliance on an investment approach to the support of basic research. Procurement procedures, most participants felt, should be used only to support university activities of a more applied and mission-oriented nature.

Donald Langenberg stated that a shift toward the investment approach is important even if paperwork and other requirements do not decrease. Drawing on his experiences in the university and in the government, he commented: "One of the enormous frustrations that everybody from working-level scientists to agency program officers have at the moment is that when you are trying to fit a research system somehow into mechanisms based on a procurement system, there are just all sorts of dissonances that, as you try to deal with them, get enormously frustrating. I think if those dissonances weren't there, we might be prepared to put up with about as much paperwork, but paperwork that fits the system."

The possibilities for improving the sponsored research system that were considered at the hearing are outlined below in two categories--those concerned with the pre-award phase of sponsored research and those concerned with the post-award phase. These suggested changes in the system represent means by which the investment approach can be put into practice.

Pre-Award Phase

Preproposal Contact. Commentator Marvin Moss of the Office of Naval Research reported that ONR encourages early oral communication between its scientific officers and prospective proposers of research. A finding of mutual interests leads to a preproposal document of one or two pages outlining technical objectives, approach, instrumentation needs, graduate student support, and costs. If matters do not work out, both the scientific officers and the academic scientists save a lot of time. Moss termed the procedure "invaluable" and suggested that wider use of this procedure would help streamline the system.

Standardized Proposals. Commentator Donald Langenberg, joined by others during the day, called for simplification and standardization of the requirements for writing proposals. "Anything that can be done to streamline this part of the system," he said, "would save money and improve scientific productivity." Mention also was made of efforts within NSF and ONR to more fully automate proposal processing and review procedures.

John Toll, president of the University of Maryland, cautioned that efforts toward standardization not go too far. He considers the differences in attitudes of the various agencies important. "It is not just that you have several chances for the same proposal to be reviewed, but they really come at the research enterprise with different points of view and with methods of selection that are related to their different points of view, and the diversity is healthy.... You won't be able to impose on [this] wide spectrum of approaches a single set of proposals or procedures, and it would be undesirable to do so." Still, hearing panelist William Raub of NIH thought that more could usefully be done in improving the proposal submission process across the Federal Government. "The factor most lacking," he suggested, "is an institutionalized process through which such improvements could be developed, implemented, and maintained."

Accomplishment-Based Awards. Commentator Wiesenfeld suggested that, in selecting research for funding, more emphasis be placed on investigators' previous work and less on estimates of the value of proposed work. This suggestion was repeated often during the day and was widely supported. And indeed, NSF and NIH have initiated such procedures on a small scale.

Problems with this approach, however, were suggested by hearing participants. First, John Wiesenfeld pointed out that his experience with accomplishment-based awards has been negative because reviewers still base their perceptions and ratings on the work proposed, presumably out of habit. To solve this problem, Wiesenfeld suggested that it may be necessary to put review teams in the same place at the same

time and to give them specific instructions. In general, Wiesenfeld felt that the use of review panels has advantages over the use of individual evaluations done by mail.

A second problem raised was that reliance on track records would place junior scientists, and investigators who are changing fields or reentering a field, in an unfair position. The system would have to retain the flexibility to handle such cases. One suggestion was that initial support for junior faculty could come from block grants to departments; quality would be maintained by regular review of departments' new faculty appointments. Block grants were not favored as a general method of funding basic research, however, because it was felt that local allocation of such funds "could easily become a political quagmire."

Longer Funding Periods. Many participants felt that increasing the duration of basic research awards from 3 years to 5 would substantially decrease "the constant shuffle of proposals required to maintain even a modest research endeavor." Five years, moreover, is more commensurate with the time scale of fundamental research. In Wiesenfeld's view: "Initiation of a new program (including the acquisition and/or construction of complex equipment, recruitment of graduate students, etc.) almost invariably results in periods of low output. This is also true of the normal fluctuations in apparent research productivity arising from the development of techniques for tackling difficult problems." George Palade of Yale University added that extending the duration of grants from 3 years to 5 might shift the emphasis in the review and evaluation of investigators from the number of papers published per year to the quality of papers published over a 5 year period, in addition to increasing the stability of support.

Commentator Stubbe proposed, as an alternative to the NIH Research Career Development Award, 5 rather than 3 years of support for all new investigators who receive awards through peer review of proposals. Such a policy would ease the financial pressure on young faculty during the demanding years when they have heavy teaching loads and are trying to set up a laboratory, train new graduate students, and be creative and productive.

Longer grant periods do entail practical problems. If NIH made all first-time awards for 5 years instead of 3, the commitment in the fifth year would rise about $250 million. "That is a substantial commitment," Director Wyngaarden pointed out, "in the light of uncertainties about future budgets. Longer awards might well result in fewer awards 4 or 5 years later. The tradeoff may be appropriate, but it must be made with eyes open."

Investigator's Career Stage. From the discussion of award procedures and funding periods it became clear that differentiating the pre-award procedures of the sponsored research system would be desirable to allow review, evaluation, and award decisions to be linked more closely to the investigator's career stage. Procedures tailored to young investigators, midcareer scientists, and senior scholars, it was felt, would improve the efficiency of the system and enhance morale greatly.

Funding Instruments. John Holmfeld, a congressional staff member, felt that research grants, with their elaborate work statements taken from the project proposals, are inherently part of a procurement system. "If you want to switch government support for research into a support mode," he suggested, "one needs to switch to a mode of support where the description of what is to be done is much less detailed. You need to switch to block grants,...formula grants,... or institutional types of support." Bernadine Healy of the Office of Science and Technology Policy concurred: "... when you have grants that are written the way project grants are written now, you are buying a product. You are procuring..."

Post-Award Phase

Financial Flexibility. The need for more financial flexibility in post-award budgetary matters was a common theme during the hearing. Commentator Stubbe remarked, for example, that cost transfers between "related" projects mediated by a system like the NIH Institutional Prior Approval System could be useful in obtaining equipment. In many cases, artificial barriers have been raised to make such cost transfers difficult both within and between projects in order to satisfy procurement-type requirements. Stubbe would also like to see award budgets extended, without additional funds, for up to 9 months beyond approval time. The 9 months is based on the time required to resubmit a proposal and have it rereviewed. Carry over of unexpended balances from year to year within a grant period would be helpful as well. More flexibility and carry over would ease the last-minute rush in many laboratories to spend some thousands of dollars relatively fast, leading to inefficiencies in the use of grant funds.

Unit of Accountability. Several participants proposed that the unit of post-award accountability, currently the individual project grant, be broadened. David Mears suggested a shift from the transaction-by-transaction relationships between federal agencies and universities to an agency-to-university relationship. "Tons of paper," he noted, "are involved in repetitive requirements generic to the transaction-by-transaction approach. Why not aggregate them?"

A step in that direction is the TBSR program of ONR, which emphasizes agency review of a university's business management systems rather than review of individual transactions on a contract-by-contract and a grant-by-grant basis. Commentator Tom Dolan of ONR noted, however, that current regulations prevent ONR from achieving its ultimate goal--monitoring systems instead of individual awards. Given suitable changes in the rules, Dolan sees "a great possibility that we will be able to monitor effectively on a systems basis."

Delegating Prior Approvals. Commentator Anthony Merritt proposed a demonstration program of an expansion and standardization of the prior approval systems, IPAS and OPAS, instituted by NSF and NIH respectively. He suggested that a common set of prior approval authorities be delegated to 10 to 15 universities for a period of 12 to 18 months. The authorities would be those already delegated to universities by one or more agencies and include pre-award costs, no-cost project and budget-period extensions, special purpose equipment, general purpose equipment, patient care costs, foreign and domestic travel costs, subcontracts and subgrants, and project-related work. The demonstration program, therefore, would not focus on the authorities themselves, but on the feasibility and effects of standardizing them and expanding their use across the Federal Government.

Standardized Administrative Requirements. The call for standardized post-award financial and administrative requirements across the federal agencies was repeated often. Universities seek to deal with one federal government, not several. There was no qualification to this request as had been expressed in relation to the call for standardized pre-award proposal processes, but presumably the same concern with maintaining diversity among the agencies applies.

Administrative Incentives. Commentator Langenberg proposed consideration of some form of incentive to reward universities for effectiveness in providing administrative, financial, and management procedures for research. One possibility would be to use a systems review as a basis for rating institutions like bonds (A, AA, AAA, B, C, etc.). These ratings would be published. Then institutions might be given a small amount of general support keyed to their ratings, and perhaps modeled after the Biomedical Research Support Grant Program of NIH.

Comprehensive Approaches. Comprehensive approaches to modifying the sponsored research system, incorporating many of the individual suggestions described above, were proposed by Commentator Elke Jordan of NIH and by Commentator Robert Newton of NSF. Jordan proposed a fixed-price grant. Newton proposed a series of changes which, in total, define a model system for use by all federal agencies. The proposal was developed jointly by him, Commentator Thomas Dolan, and Commentator Ellen Feinsilber of the Department of Energy.

The highlights of each proposal are outlined briefly below. For a more complete description, the reader should refer to the prepared presentations by each commentator in Part II of the full report and to the document entitled "Federal-University Research Support Relationships" in Part III of the same volume. Two comments should be made about these proposals: (1) the underlying philosophy, the objectives, and the means for implementing each proposal are similar, and (2) developments since the June 5 hearing indicate that it is likely that a demonstration program will be put in place for funding university research in one state using procedures based on the common central features of these two proposals. More will be said about this in the concluding section of this summary.

1. Fixed-Price Grant. Underlying Elke Jordan's proposal for a fixed-price grant are her views on the essential elements of support for basic research: a research proposal; a review of the proposal to determine the prospects for gaining new knowledge; an award of an appropriate amount of money to do the work; and an evaluation of the project on completion to determine progress toward significant publishable results. Since the results are initially unknown, the award is "essentially buying the creativity of scientists."

   The fixed-price grant would be awarded as at present on the basis of the scientific merit of applications. Direct and indirect costs for the entire grant period would be negotiated before the grant was made and would be fixed for each grant year. The investigator and institution would agree to do the research at the specified level of effort for the specified time. The only actions requiring prior approval would be change of principal investigator, change of institution, and major change of project goals. Annual budgets would not be mandated, but a simple report of how the money was used would be required at the end of the grant period (for direct costs only; institutions use reimbursed indirect costs as they wish). Spot checks and audits of grantee accounts would have to be maintained and perhaps even expanded to ensure accountability for public funds.

   Jordan believes that this simplified grant would save significant money and time in both government and the universities. She contends that the most important decisions about awards are which proposals to fund and for how much. "All the other decisions we make are orders of magnitude less important, so the efforts of federal staff should be directed mainly at these important decisions."

   Henry Kirschenmann's comments supported this view. He surmised that the approach to research awards probably should

be "a really stringent up-front review when the budget is made, tied into the scope of the research to be done." He felt it was important that such an approach be recognized by Congress, and it might even need to be made into law to forestall later questions about accountability procedures.

2. A Model Research Support System. Newton, Dolan, and Feinsilber, in their proposal for a model system, argued that initiatives like OPAS, IPAS, and TBSR will not help improve the system a great deal in the long run because they are piecemeal. "Universities are dealing with seven or eight federal governments," they maintained. "A standard federal arrangement (instrument) for supporting research is needed."

   Their proposal is to design a standard federal agreement, to be used by all the federal R&D agencies for supporting university research, that includes the following central components: (1) recognize an investigator's program of research rather than individual projects as the administrative and accounting unit; (2) authorize universities to allow pre-award costs and to extend completion dates of awards; (3) establish a government-wide method of reviewing and approving university management and financial systems; and (4) ensure appropriate accountability in research by pre-award scientific and technical review of proposed research and the dollars proposed to be spent on it, pre-award approval of recipient's pertinent business and management systems, review of the research progress or product, and audit review to assure that the funds were spent for the relevant program of research.

   In the views of these three federal officials, this system would match the reality by which research is carried out; investigators and research administrators "would not have to play all the games they are now playing." This proposal, like the one above, eliminates the need for transaction-by-transaction federal and institutional approvals and reviews, places the responsibility for research management with the individual investigator, and thereby serves to move the system toward an investment-oriented relationship between the sponsor and the performer of research. An added benefit to such a model federal system, the officials felt, might be a move on the part of the states to adopt a parallel system for their relationships with public universities.

   Commentator B. Reid Detchon of Senator John Danforth's office agreed with this approach. He felt it makes sense to standardize post-award requirements across all agencies; to require prior approval only for major changes, such as changes

in scope or principal investigator; and to allow investigators to allocate their grant resources freely within their research programs. He foresaw "a substantial constituency in Congress for relieving some of [the burdens in the research system]."

The Context For Change

The broad-based consensus at the hearing that improvements in the sponsored research system are required led to discussion of how change is best achieved. Hearing panelist Bernadine Healy of the Office of Science and Technology Policy said the answer is not "one central mandate." She maintained: "We have a system of checks and balances that must be addressed at numerous levels. Change must be pursued in part at the level of each of the agencies. Many of the goals--such as lengthening the duration of research awards--can be attained by administrative action within the agencies. They do not require legislation, or a major policy statement, or an executive order. Reaching the desired goals is nonetheless complicated. I think everybody agrees on the long-term strategy, but the tactics are not so easy."

For a research system as diverse and complex as that in the United States, a grass roots approach to change was favored by many participants. Meaningful and lasting change will be implemented by working with financial and management specialists, program officers, NIH study section executive secretaries, and other officials central to running the bureaucracy. Supporting this activity must be policy-level goals and objectives enunciated by the highest-level policy officials.

Congressional staff members Coakley and Detchon emphasized the support within the Congress for relieving bureaucratic accretion within the sponsored research system, but agreed that it was desirable to achieve the improvements through administrative actions rather than legislation. They noted however, that congressional hearings and other techniques at the disposal of the Congress might be used as a way to attract attention to the issues and to provide encouragement to administrative initiatives.

Some, however, were less sanguine about the prospects for change if the responsibility were left solely to the federal agencies working in partnership with the universities. The phenomenon of criticism insurance, described earlier, makes it unlikely that change will come from within the federal agencies, in the view of John Dearden of Johns Hopkins University. Dearden suggested that the only way to get results is through "directive change," probably through a partnership of Congress and the White House, with the direction originating in the Office of Science and Technology Policy.

There are also factors operating within the academic community that cause resistance to change. Nobody likes Circular A-21, panelist Healy noted, but many academic people do not like the idea of tinkering with it because, with the status quo, they know where they stand. Similarly, according to Commentator Coakley, academic officials, as recipients of federal money, do not want to rock the boat, especially without assurance of broad support in the academic community. He said that the universities lack consensus on the primary purpose of the government-university relationship. The academic community does not say clearly whether its members consider themselves suppliers of purchased goods or recipients of federal investments designed to support and stimulate the research enterprise.

Industry, too, has an interest in the government-university sponsored research system according to Fred Leavitt of the Dow Chemical Company. He put forth a specific suggestion of how industry might help to bring about improvements in this system. He proposed that individual universities or groups of universities design demonstration programs centered around new and more effective ways to manage the research enterprise on campus. Industry would support these demonstration programs to the extent possible for a set number of years with a careful assessment of the impacts of the program on the research environment within the university. In Leavitt's view, industry would be interested in such activities because it is in their interests that the university research environment operate at maximum efficiency and effectiveness. Industry would play two roles in these demonstration programs: (1) Industry representatives would sit on the advisory committee to the program to observe how the project is going, and offer suggestions as to how the research environment might be managed most effectively. (2) As the demonstration program matured, industry would be party to publicizing the results to ensure that the most desirable aspects of the demonstration program were adopted on a broader scale throughout the research enterprise.

Another industrial participant, Serge Gratch of Ford Motor Company, maintained that the hearing was dealing with bandaid solutions. He stressed that the real problem is more fundamental than those discussed and centers on his feeling, described earlier, that the system simply does not reward innovation and risk-taking. Without change in that aspect of the system, he felt, many of the suggestions made during the course of the hearing would not result in substantial improvements. Marvin Cohen of the University of California at Berkeley, however, said that he preferred the bandaid approach to bringing about change. "If we say the problem is so large that we can't do anything until the entire system changes," he maintained, "we won't do anything." Panelist Linda Wilson added, "It may look like bandaids, but if we think the system is slow to deal with bandaids, it will be even slower to do anything with rather major structural changes, even if we knew what those changes should be."

"The climate is right for change" was a common refrain among many hearing participants. In their view, convergence around a common set of principles that should guide the sponsored research system is as close as it has ever been. While consensus becomes "frayed around the edges" when moving on to strategies and tactics for implementing these principles, participants felt it was time to test new approaches through pilot programs, demonstration programs, and the like.

In approaching these experiments with new procedures, participants urged that prior experience be examined carefully. It was pointed out that the fixed-price grant and incentives for improving university management had been proposed in the past, but neither initiative had been adopted. The fixed-price grant, then called the fixed-obligation grant, was proposed to NIH in 1980. It failed for several reasons, according to hearing panelists William Raub and Linda Wilson. NIH had faced severe congressional criticism of its financial stewardship and was reluctant to make dramatic changes. Also, one feature of the fixed-obligation grant was that unexpended balances would not be returned to the agency. However, NIH had come to rely on such returns, which often totaled 3 to 4 percent of the funds originally awarded. Further, the payoff from the change would have been largely intangible--the reduction in administrative costs could not be documented to be large.

Commentator Kirschenmann recounted that the idea of incentives for university administration had been raised many times in the past. It has not worked out, he believed, because "we don't know what the incentives might be and how you can make the incentives large enough for an institution to respond." Also, he felt that there was resistance among universities to being graded by outsiders.

One lesson to be learned from the experience with the fixed-obligation grants, Linda Wilson felt, is that "we have got to come to some agreement about reachable goals and not have unrealistic expectations of great dollar savings. What we really are talking about with many of the issues raised today are improvements in the research environment, reductions in frustration, consequent improvement in research productivity, and allowing scientists to do what they do best and not having them do other things that they don't do very well."

In their closing remarks, Alvin Trivelpiece of the Department of Energy, and Dale Corson, Roundtable Chairman, continued to address the issue of tactics for bringing about change. They reaffirmed that "the system was in the room" and that the hearing participants have the power to start peeling back the layers of bureaucratic accretion. As one example of an individual action that can have some salutary effects, Trivelpiece pointed out that policy statements by Cabinet secretaries do have an impact within their agencies. He described the

statement by the Secretary of the Department of Energy that outlined the expected performance of assistant secretaries in dealing with the academic community. Trivelpiece said the statement "gives people in the academic community the moral authority to holler at an assistant secretary if he or she is behaving in a manner different from that which the policy statement outlines." He encouraged university presidents to issue similar policy statements within their institutions that would define for their administrators the acceptable limits of bureaucracy.

Trivelpiece and Corson concluded that actions were required by universities, by state governments, and within the Federal Government by the funding agencies, by the Executive Office of the President, and by the Congress. Overlaying these decentralized actions and distributed responsibilities must be "an institutionalized process for improving and maintaining the productivity of the sponsored research system." An institutionalized process is needed to constantly stimulate the individual initiatives and to ensure that they come together into a beneficial whole. Without constant attention to the system, Christopher Hill of the Congressional Research Service and other participants felt, bureaucratic requirements are as likely to accrete around any new procedures put into place as they have around the existing ones. The Research Roundtable, it was suggested, is well suited to serve this function.

Unfinished Business

Three topics related to bureaucratic accretion in the sponsored research system received only brief mention during the course of the hearing and indications were made that these warrant further attention. One is the actions that universities and faculty should be taking on their own to improve the research environment on individual campuses. Commentator Wilson noted that universities could do a great deal to improve the productivity of sponsored research independently of government. Anthony Merritt agreed: "In our efforts to redress the current situation, we must carefully examine our own internal [university] policies and procedures to assure that they are the minimal needed to satisfy our needs as well as those of our sponsors."

David Blake of Johns Hopkins University reported that, in his experience, research agreements with the private sector are much more diverse and complex than those with government. He suggested that the Roundtable consider an effort to bring about more standardization among agreements between universities and industry.

Commentator John White of the Georgia Institute of Technology described significant changes occurring in the federal support of engineering research in recent years. He mentioned particularly the trends toward larger multiyear grants; team-oriented, cross-disciplinary research; and industry-university cooperative research. White favors these trends, but does not believe the necessary administrative, management, or financial infrastructure has been established. He noted, for example, that agencies' funding systems must reflect the team concept rather than the principal investigator concept; in the universities, the system of recognition and rewards must change to reflect the emphasis on team research.

Developments Since The Hearing

The issue of reducing bureaucratic accretion remains a Research Roundtable priority. As a result of the hearing, two sets of procedures are underway.

First, Roundtable Chairman Dale Corson has written to all participants in the hearing asking them for three things: (1) to share their plans for implementing suggestions made at the hearing with the Roundtable; (2) to involve a much broader constituency beyond those present at the hearing in consideration of improving the sponsored research system; and (3) to provide the Roundtable with suggestions of topics that deserve continuing attention. Responses to this letter have revealed continuing activities within the federal agencies directed toward streamlining the research granting system; broad-based interest in the Senate for revision of OMB Circular A-110, which defines the financial management, procurement, and audit procedures for federal support of university research; as well as activities at individual universities and within professional organizations. Also included in the responses were elaboration on points raised at the hearing together with suggestions related to the three items of unfinished business listed above.

The second follow-up activity is the design and implementation of a demonstration program of a more investment-oriented approach to federal support of research in universities. The design of the demonstration program is based on the model system described by commentators Bob Newton, Ellen Feinsilber, and Tom Dolan at the hearing. Representatives from the National Science Foundation, the Department of Energy, the Department of Health and Human Services and the National Institutes of Health, the Office of Naval Research, the Department of Agriculture, the Environmental Protection Agency, and the National Aeronautics and Space Administration are working together on the development of a federal instrument for the support of university research that would standardize post-awarded procedures across the several federal R&D

agencies. A demonstration of this standard research instrument will be conducted in all research agreements of the participating federal agencies and with the universities in the Florida State University system and at the University of Miami, beginning in 1986 and running for a period of approximately 2 years.

Momentum has been generated for examining and modifying the sponsored research system. All parties with a stake in the system and with the power to change it are involved. The challenge facing the Research Roundtable is to maintain this momentum and to ensure that it continues to be distributed throughout all elements of the system.

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